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10/649,102	08/27/2003	Peter J. Winzer	Winzer 4	5476

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EXAMINER

GARCIA, LUIS

ART UNIT	PAPER NUMBER
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2613

DATE MAILED: 08/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/649,102

Applicant(s)

WINZER, PETER J.

Examiner

Luis F. Garcia

Art Unit

2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on August 27, 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 17-33 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. **Claims 1-3, 6, 8, 9, 12, 19-21, 24-26, 29 and 33 are rejected** under 35

U.S.C. 102(b) as being anticipated by Franck et al (IEEE Photonic Technology Letters, April 1998) hereinafter referred to as Franck.

Regarding claim 1, Franck discloses an apparatus for generating a modulated optical signal (**FIG. 2**), the apparatus comprising:

a signal splitter adapted to receive and split an input data signal into first and second copies (**FIG. 2 (Diff. Enc) in which the differential encoder splits the input data signal into first and second copies**);

a delay element adapted to receive and delay the first copy relative to the second copy (**FIG. 1 (τ) in which τ is adapted to receive and delay the first copy relative to the second copy**); and

an optical signal modulator adapted to modulate light fed to the modulator in accordance with first and second control signals based on the delayed first copy and the second copy, respectively, to generate the modulated optical signal (**FIG. 2 (MZ) in which the MZ modulator is adapted to generate a modulated optical signal in accordance with the delayed first copy and the second copy**).

Regarding claims 19 and 33, rejected as stated in claim 1 apparatus rejection.

Regarding claims 2 and 20, Franck further discloses comprising a differential encoder adapted to receive and differentially encode a non-differentially encoded data signal to produce the input data signal (**FIG. 2b (Diff Enc) in which a the differential encoder is adapted to produce a differentially encoded data signal (FIG. 2d) based on a non-differentially encoded data signal (FIG. 2a))**).

Regarding claims 3 and 21, Franck further discloses wherein a differentially encoded signal is level shifted in response to receiving a logical one in the non-differentially encoded data signal (**FIG. 2a,e in which the differentially encoded signal (FIG. 2e) is level shifted in response to receiving a logical one in the non-differentially encoded data signal (FIG. 2a))**).

Regarding claim 6 and 24, Franck further discloses wherein a logical one in the input data signal results in an intensity pulse in the modulated optical signal (**FIG. 2a,c in which a logical one in the input result in an intensity pulse in Pout (modulated signal))**), wherein the intensity pulse has a pulsewidth that is a function of the delay (**FIG. 2b,d in which the output intensity pulse is inherently a function of the delayed signal- V_2 (function of delay)**).

Regarding claim 7, Franck further discloses an inverter adapted to invert the delayed first copy generate the first control signal (**FIG. 2b: the DATA signal is inverted (becomes Q_{bar}) then delayed (via τ) in which this configuration is functionally equivalent to claimed structure, e.g. produces an inverted-delayed DATA signal which is applied as a control signal to the modulator**).

Regarding claim 8, Franck discloses the invention of claim 1 as applied above.

Dimmick further discloses wherein the optical signal modulator is a dual-drive Mach-Zehnder (**FIG. 2b (dual-drive MZ)**).

Regarding claim 25, Franck discloses the invention of claim 19 as applied above.

Franck further discloses wherein the delayed first copy is inverted prior to being applied to the modulator as the first control signal (**FIG. 2b in which the delayed first copy is inverted prior to being applied to the modulator (MZ)**).

Regarding claim 9 and 26, Franck further discloses comprising a CW laser adapted to generate the light (**FIG. 2b (LD) in which the laser diode is adapted to generate light**).

Regarding claim 12 and 29, Franck further discloses wherein the delay is less than or equal to a bit period of the input data signal (**pg597 col2 in which τ produces a 1 bit delay**).

2. **Claims 1, 5, 8, 9, 11-15, 17-19, 23, 26 and 29-33 are rejected** under 35

U.S.C. 102(e) as being anticipated by Mamyshev et al (US 2003/0175036) hereinafter referred to as Mamyshev.

Regarding claim 1, Mamyshev discloses an apparatus for generating a modulated optical signal (**FIG. 2**), the apparatus comprising:

a signal splitter adapted to receive and split an input data signal into first and second copies (**FIG. 2 (Electrical NRZ signal in) in which the NRZ signal is split into two copies**);

a delay element adapted to receive and delay the first copy relative to the second copy (**FIG. 2 (20-electrical delay) in which the first copy is delayed relative to the second copy**); and

an optical signal modulator adapted to modulate light fed to the modulator in accordance with first and second control signals based on the delayed first copy and the second copy, respectively, to generate the modulated optical signal (**FIG. 2 (24-Mach-Zender modulator) in which the modulator is adapted to generate a modulated optical signal in accordance with the delayed first copy and the second copy**).

Regarding claims 19 and 33, rejected as stated in claim 1 apparatus rejection.

Regarding claims 5 and 23, Mamyshev further discloses wherein the delay of the delay element is dynamically configurable (**FIG. 2 (20-Electrical Delay) and FIG. 7 (32-variable delay) in which the delay in FIG. 2 (20) denotes a variable delay (e.g. arrow through delay element) as further seen in FIG. 7 (32)**)).

Regarding claim 8, Mamyshev discloses the invention of claim 1 as applied above.

Mamyshev further discloses wherein the optical signal modulator is a dual-drive Mach-Zehnder (**Fig. 2 (24-Mach-Zender modulator)**).

Regarding claim 9 and 26, Mamyshev further discloses comprising a CW laser adapted to generate the light (**FIG. 2 (CW light in)**).

Regarding claims 11, and 28, Mamyshev further discloses wherein the non-differentially encoded data signal is an NRZ data signal (**FIG. 2 (Electrical NRZ signal in) and ¶0039**).

Regarding claim 12 and 29, Mamyshev further discloses wherein the delay is less than or equal to a bit period of the input data signal (**¶0039 in which the delay is equal to approximately 1 bit period**).

Regarding claim 13 and 30, Mamyshev further discloses comprising: a first driver amplifier adapted to couple the delayed first copy to the modulator; and a second driver amplifier adapted to couple the second copy to the modulator (**FIG 2 (22-driver) in which the drivers (22) are adapted to couple the delayed first copy and the second copy to respective modulator inputs**).

Regarding claims 14, 17 and 31, Mamyshev further discloses wherein one of the first and second driver amplifiers is an inverting amplifier and the other is a non-inverting driver amplifier (**FIG. 3 (DATA*) in which driver (22) and DATA* are functionally equivalent to an inverting amplifier driver amplifier with DATA in, for both**

generate an inverted data signal; thereby, making it a matter of design choice as to which design to implement).

Regarding claim 15, 18 and 32, Mamyshev further discloses wherein the first and second driver amplifiers are either both non-inverting driver amplifiers or both inverting driver amplifiers **(FIG. 3 (22-driver) in which both amplifiers are non-inverting amplifiers).**

3. **Claims 1, 2, 5, 8, 9, 12-14, 17, 19, 20, 23, 25, 26, 29-31 and 33 are rejected** under 35 U.S.C. 102(e) as being anticipated by Dimmick et al (US 6,623,188) hereinafter referred to as Dimmick.

Regarding claim 1, Dimmick discloses an apparatus for generating a modulated optical signal **(FIG. 7B)**, the apparatus comprising:

a signal splitter adapted to receive and split an input data signal into first and second copies **(FIG. 7A (102-duobinary encoder) in which the encoder splits the input signal into first and second copies (e.g. m_{bar} and m))**;

a delay element adapted to receive and delay the first copy relative to the second copy **(FIG. 7A (110-delay) in which the delay element delays the first copy (e.g. $-g(t)$) relative to the second copy (e.g. $g(t)$). NOTE: $g(t)$ is derived from m and $-g(t)$ is derived from m_{bar} as seen in FIG. 8)**; and

an optical signal modulator adapted to modulate light fed to the modulator in accordance with first and second control signals based on the delayed first copy and the second copy, respectively, to generate the modulated optical signal **(FIG. 7A (130-**

differential input data modulator) in which the modulator uses the first delayed copy and the second copy as control signals to generate a modulated optical signal (e.g. FIG. 8: $s(t)$ -output signal)).

Regarding claims 19 and 33, rejected as stated in claim 1 apparatus rejection.

Regarding claims 2 and 20, Dimmick further discloses comprising a differential encoder adapted to receive and differentially encode a non-differentially encoded data signal to produce the input data signal (FIG. 7A (102-duobinary encoder) and col2 ln51-56 in which the duobinary encoder (differential encoder) is adapted to receive a non-differential encoded signal and convert it to a binary encoded signal).

Regarding claims 5 and 23, Dimmick further discloses wherein the delay of the delay element is dynamically configurable (col8 ln54-64 in which different delays are used based on the bandwidth of the signals and the linearity of the amplifier (e.g. varies from $0.4T$ to $0.9T$); thereby, making it functionally equivalent to a dynamically configurable delay element)).

Regarding claim 7, Dimmick further discloses an inverter adapted to invert the delayed first copy generate the first control signal (FIG. 5 in which the first copy (M_{bar}) is delayed before it is inverted to generate the first control signal: $-g(t)$).

Regarding claim 8, Dimmick discloses the invention of claim 1 as applied above.

Dimmick further discloses wherein the optical signal modulator is a dual-drive Mach-Zehnder (FIG. 7B (MZI)).

Regarding claim 25, Dimmick discloses the invention of claim 19 as applied above.

Dimmick further discloses wherein the delayed first copy is inverted prior to being applied to the modulator as the first control signal (**FIG. 7B (-g(t)) in which the delayed first copy is inverted prior to being applied to the modulator-MZI**).

Regarding claim 9 and 26, Dimmick further discloses comprising a CW laser adapted to generate the light (**FIG. 7B (138-laser) in which the laser source is adapted to generate light**).

Regarding claim 12 and 29, Dimmick further discloses wherein the delay is less than or equal to a bit period of the input data signal (**FIG. 7B (110-Delay) in which the delay is equal to $0.6T$ (less than a bit period)**).

Regarding claim 13 and 30, Dimmick further discloses comprising: a first driver amplifier adapted to couple the delayed first copy to the modulator; and a second driver amplifier adapted to couple the second copy to the modulator (**FIG. 7A (114-differential amplifier) in which the differential amplifier couples the delayed first copy and the second copy to respective modulator inputs; thereby, making the differential amplifier functionally equivalent to a first and second driver used to drive separate modulator inputs**).

Regarding claims 14, 17 and 31, rejected as stated in claim 13 in which Dimmick's differential amplifier is functionally equivalent to a first inverting amplifier and a second non-inverting amplifier, e.g. FIG. 7A outputs -g(t), and a second non-inverting amplifier, e.g. FIG. 7A outputs g(t).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 10 and 27 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Mamyshev.

Regarding claims 10 and 27, Mamyshev discloses an Alternating Phase-Return-to-Zero (AP-RZ or RZ-AP) in FIG. 28 in which it is well known in the art that a related format to RZ-AP is Chirped Alternating Phase-Return-to-Zero (AP-CRZ or CRZ-AP) in which it would have been a matter of design choice as to which format to incorporate, e.g. based on transmission fiber properties, dispersion compensation in the system, etc.

5. **Claim 4, 11, 22 and 28 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Dimmick.

Regarding claims 4, 11, 22 and 28, Dimmick further discloses wherein the non-differentially encoded data signal is an NRZ data signal (**FIG. 8 (d_n -input data signal)**) in which it is well known in the art that a binary input data signal is represented in a variety of formats (e.g. NRZ, RZ,...).

Allowable Subject Matter

6. Claim 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion


7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Conradi (US 2003/0156774) in which Conradi discloses that RZ-AP, CRZ-AP, unipolar RZ and single-phase RZ binary modulation formats are well known in the art ¶0005.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis F. Garcia whose telephone number is (571)272-7975. The examiner can normally be reached on 8-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken N. Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LG


SUPERVISORY PATENT EXAMINER